SWR-0004

16 Appeal Brief 3 Color 103-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPELLANT:	KLAUS-LEO WILBUER, ET AL.	) Before the Board of Appeals
SERIAL NUMBER:	09/446,623	)
FILED:	March 21, 2000	) Appeal No.:)
FOR:	PROCESS FOR PRODUCING A NEUTRON-ABSORBING COATING	) Art Unit 3641)

APPEAL BRIEF

I hereby certify that this correspondence was deposited with the United States Postal Service as first class mail in an envelope addressed to: Box AF, Commissioner for Patents, Washington, D.C. 20231 on

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(Name of Person Mailing Paper)

Signature 09/19/2002
Date

1. THE REAL PARTY IN INTEREST

The real parties in interest in this Appeal are Metallveredlung GmbH & Co. KG and GNB Gesellschaft für Nuklear-Behälter mbH. Ownership by Metallveredlung GmbH & Co. KG and GNB Gesellschaft für Nuklear-Behälter mbH is established by assignment document recorded for this application on March 21, 2000, at Reel 010705, Frame 0448.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interference proceedings known to Appellants, Appellants' legal representatives, or assignees that will directly affect or be directly affected by or have a bearing on the decision of the Board of Patent Appeals and Interferences in the pending appeal.

3 STATUS OF CLAIMS

Claims 1-13 are pending. All of the claims stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wang (United States Patent No. 4,238,299) (hereinafter "Wang") in view of Baburek (EPO Publication EP 55679) (hereinafter "Baburek").

4 STATUS OF AMENDMENTS

There have been no amendments filed subsequent to receipt of the Final Office Action.

5 SUMMARY OF INVENTION

The present invention is directed to a method of producing a coating for absorbing neutrons. From a dispersion bath containing boron, the coating of boron-nickel is produced on at least part of a shielding element such that the neutrons created in a nuclear reaction of radioactive materials are absorbed by the boron-nickel layer. The dispersion bath may include boron carbide or boron in elemental form. (Specification, page 3, lines 14-16). During the coating process, a relative movement is produced between the surface to be coated and the dispersion bath (specification, page 3, lines 7-10), the relative

movement optionally being produced by moving the element to be coated (specification, page 4, line 5). The surface to be coated may be arranged face-up in the bath (specification, page 4, lines 12-13), and the coating may be deposited chemically or electrolytically (specification, page 4, lines 2-3) to a thickness of 350 micrometers (um) to 500 um (specification, page 3, lines 17-18). With respect to the coating, the boron is inserted into a nickel matrix such that the boron content is greater than about 20% or even greater than about 40%. (Specification, page 3, lines 13-14). The method is economical and easy to use, provides for increased effectiveness of the absorption, permits greater variability in terms of the basic materials and shape of the coated shielding elements, and further permits production of lighter shielding elements that have the same or greater absorption qualities as elements having thicker coatings. A shielding element produced by the method may be composed of an inorganic basic material with a boron/nickel coating containing more than 20% boron or boron carbide by volume. (Specification, page 4, lines 22-27).

6 ISSUES

There are two issues on appeal: (1) whether claims 1-12 are patentable under 35 U.S.C. §103(a) over Wang in view of Baburek; and (2) whether claim 13 is patentable under 35 U.S.C. §103(a) over Wang in view of Baburek.

7 GROUPING OF CLAIMS

There are two groups of claims. Claims 1-12 comprise the first group. Claims 1-12 stand or fall together under the Examiner's contested rejection of these claims. Claim 13 comprises the second group.

8 ARGUMENT

A. Rejection of claims 1-12 under 35 U.S.C. §103(a): Claims 1-12 are patentable over Wang in view of Baburek.

Under the first grouping of claims, independent claim 1 is patentable over Wang in view of Baburek. To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings, there must be a reasonable expectation of success, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed.Cir. 1988); *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 USPQ2d, 1016, 1023 (Fed.Cir. 1996).

The Examiner alleges that Wang discloses a process for coating a shielding element with a boron-copper layer, but that Wang does not disclose expressly that his method is applicable to the deposition of boron-nickel particles. The Examiner further alleges that Baburek discloses a method for coating a shielding element with a boron-nickel layer. The Examiner also alleges that with respect to claim 1, it would have been obvious to one having ordinary skill in the art to apply the coating method of Wang using the materials disclosed in Baburek, and that the suggestion/motivation for doing so would have been to agitate the copper-boron electrolyte solution thereby achieving an even distribution. (Detailed Action, Paper No. 9).

Appellants claim a method of producing a coating in which a shielding element composed of a basic material is provided on a surface with a boron-nickel coating. During the coating process a relative movement is produced between the surface to be coated and the dispersion bath. (Appellants' claim 1). The relative movement may be produced by moving the element to be coated. (Appellants' claim 2). The boron may be deposited as boron carbide or elemental boron into a nickel matrix in magnitudes of greater than about 20% by volume. (Appellants' claim 9).

Wang discloses a method for producing shielding elements containing boron carbide particles embedded in a copper matrix. The method teaches that a tube of stainless steel is removably situated on the bottom of an electrolytic cell so as to be disposed in electrical contact with a cathode contact connected to a current source. (Column 3, lines 6-12). The cell is filled with "conventional copper electrolyte solution 24 containing copper ions" such that "[t]he entire cell 10 is filled to a level above [an]

anode 12...." (Column 3, lines 16-18). The anode 12 is connected to the current source. "[B]oron carbide particles 26 are introduced through [a] funnel 14 while *agitating the electrolyte solution with the stirrers 16.*" (Column 3, lines 20-22) (emphasis added). A thin layer of copper is plated on the exposed upper surface of the tube (before or during the introduction of the boron carbide particles) to improve the bonding between the stainless steel and the layer to be built up on the tube surface. (Column 3, lines 24-27). "[*T*]*he stirrers 16 are* [*then*] *stopped to allow the particles to settle onto the surface of the tube 18 while electroplating proceeds...,*" thereby trapping the boron carbide particles in the copper plate. (Column 3, lines 29-31) (emphasis added).

Wang fails to teach a method for producing a coating wherein a relative movement is produced between the surface to be coated and the dispersion bath, as is claimed by Appellants. In Wang, the particles merely *settle* onto the surface. Appellants assert that the *producing* of a relative movement is not taught by Wang. Specifically, Appellants assert that the proactive *producing* of a relative movement is in direct contrast to the passive *settling* of particles from a liquid carrier. Relative movement, as is claimed by Appellants, is actually counterproductive in a bath as described by Wang because such relative movement would cause mixing of the bath solution which would, in turn, cause a disruption of the settling of the particles on the surface to be coated, thereby resulting in the uneven deposition of coating particles.

Furthermore, the production of relative movement, as claimed by Appellants, provides for the boron-nickel coating of surfaces oriented normal to the direction of movement of the surface. The relative movement provides a method of producing a coating that is independent of the gravitational forces acting on the coating particles settling out of the liquid medium, as in Wang, thereby obviating the need for stirring the suspension of boron-nickel coating particles in the liquid medium. By avoiding the use of stirring devices, the thickness of the coating is not a function of the "settling time" (as in Wang), but can instead be controlled by the relative movement of the surface being coated. Because the deposition of a coating beyond a certain thickness will not provide any added protection toward reducing neutron radiation, Appellants' method of producing a coating can be controlled (via movement of the coating surface) to deposit a coating that provides the optimum efficiency in reducing radiation by eliminating excess

deposition of boron-nickel. A person of skill in the art would not, therefore, be taught or motivated to create a layer of boron-nickel without the use of stirrers. Additionally, the fact that the particles "settle onto the surface of the tube 18..." in Wang provides no suggestion or motivation to impart movement to the surface to be coated.

Baburek teaches a box for the underwater storage of irradiated nuclear fuel assemblies. An external surface of the box includes a coating consisting of boron carbide particles embedded in a nickel binder. The coating of boron carbide particles embedded in the nickel binder is preferably deposited on a sheet metal surface using a plasma torch and nickel-coated boron carbide particles. A continuous layer of nickel covers the coating.

Baburek fails to teach a method for producing a boron-nickel coating wherein a relative movement is produced between the surface to be coated and the dispersion bath, as is claimed by Appellants. The deposition of powder on a surface in a plasma environment precludes relative movement of the surface to be coated. Furthermore, the plasma environment of Baburek is necessitated by the physical characteristics of the materials of Baburek (boron carbide in a nickel binder coated with nickel). By contrast, Appellants' invention (the boron-nickel coating on the basic material) is different from a nickel-bound boron carbide structure further coated with nickel and furthermore does not necessitate a plasma environment.

The combination of Wang and Baburek also fails to teach or suggest Appellants' invention, viz., a method of producing a boron-nickel coating where a relative movement is produced between the surface to be coated and the dispersion bath. Appellants assert that because neither Wang nor Barburek individually teach the producing of a relative movement between a surface to be coated and a dispersion bath, the combination of Wang and Barburek necessarily cannot teach the producing of a relative movement between such a surface and a bath. In particular, Appellants assert that the combination of a method in which a solution is intermittently agitated such that boron carbide particles settle onto a surface during a simultaneous electrodeposition of copper (Wang) with a method in which boron carbide is disposed onto a surface via plasma deposition followed by an electro- or chemical deposition of nickel (Baburek) provides no suggestion or motivation for being combined to arrive at Appellants' invention (the producing of a

boron-nickel coating on a surface by the relative movement of the surface and the dispersion bath). Appellants assert that the methods of Wang and Baburek are two vastly different methods that are mutually exclusive of each other. As such, the methods of Wang and Baburek, alone and in combination, in no way teach or suggest the producing of a relative movement between a surface to be coated with a boron-nickel coating and a dispersion bath as is claimed by Appellants.

For at least the foregoing reasons, all of the limitations of claim 1 are not taught or suggested by Wang and Baburek, either individually or in combination. Thus, the Examiner's rejection of claim 1 under 35 U. S.C. §103(a) as being obvious over Wang in view of Baburek is improper. Because claims 2-12 depend from claim 1, and because claims that depend from a claim that is non-obvious are themselves necessarily non-obvious, Appellants submit that claims 2-12 are non-obvious. Therefore, Appellants respectfully assert that the Examiner's rejection of claims 2-12 is also improper. Appellants respectfully request the reversal of the 35 U.S.C. §103(a) rejection of claims 1-12 on these grounds.

B. Rejection of claim 13 under 35 U.S.C. §103(a): Claim 13 is patentable over Wang in view of Baburek.

Under the second grouping of claims, independent claim 13 is patentable over Wang in view of Baburek. As stated above, to establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings, there must be a reasonable expectation of success, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Fine*; *In re Wilson*; *Amgen v. Chugai Pharmaceuticals Co.*

As above, the Examiner alleges that Wang discloses a process for coating a shielding element with a boron copper layer, but that Wang does not disclose expressly that his method is applicable to deposition boron nickel particles. The Examiner further alleges that Baburek discloses a method for coating a shielding element with a boron-

nickel layer. The Examiner also alleges that with respect to claim 13, it would have been obvious to one having ordinary skill in the art to apply the coating method of Wang using the materials disclosed in Baburek, and that the suggestion/motivation for doing so would have been to agitate the copper boron electrolyte solution thereby achieving an even distribution. (Detailed Action, Paper No. 9).

The teachings of both Wang and Baburek are presented above.

Both Wang and Baburek, alone and in any combination, fail to teach or suggest a shielding element produced by a method in which a coating is produced by a relative movement between the surface to be coated and the dispersion bath. In particular, Appellants assert that the combination of a method in which a solution is agitated and from which boron carbide particles settle onto a surface during a simultaneous electrodeposition of copper (Wang) with a method in which boron carbide is disposed onto a surface via plasma deposition followed by an electro- or chemical deposition of nickel (Baburek) in no way teaches or suggests a shielding element produced by a coating process in which a relative movement is produced between the surface to be coated and a dispersion bath, as is claimed in Appellants' claim 13. Moreover, because both Wang and Baburek are mutually exclusive of each other, both Wang and Baburek, alone and in combination, do not suggest or motivate one of skill in the art to produce a shielding element by providing a relative movement between the surface to be coated and the dispersion bath.

Furthermore, Wang teaches away from Appellants' invention insofar as Wang teaches a method of coating an object with a layer of boron carbide embedded in copper. (Wang, claim 1). In Wang, the deposition of copper ions from a copper electrolyte solution provides the matrix in which the boron is embedded. Because substantial portions of the structures associated with the shielding of neutrons comprise stainless steel, and because copper provides a corrosive environment for stainless steel thereby rendering it incompatible with stainless steel, Wang does not provide an adequate solution to the problem of neutron absorption in the nuclear reaction of radioactive materials. In contrast to copper, nickel (as claimed by Appellants) provides for the improved shielding of neutrons while minimizing or eliminating the corrosive effects of nickel on stainless steel. Appellants, therefore, assert that a process of depositing copper

to form a shielding element as in Wang would not teach or suggest the depositing of nickel, as is claimed by Appellants. Consequently, it would not be obvious to one having ordinary skill in the art to apply the coating method of Wang using the materials of Baburek or any other reference to arrive at Appellants' invention.

For at least the foregoing reasons, all of the limitations of claim 13 are not taught or suggested by Wang and Baburek, either individually or in combination. Furthermore, Wang and Baburek, individually and in combination, lack any suggestion or motivation to be combined to arrive at Appellants' invention. Thus, the Examiner's rejection of claim 13 under 35 U.S.C. §103(a) as being obvious over Wang in view of Baburek is improper. Appellants respectfully request the reversal of the 35 U.S.C. §103(a) rejection of claim 13 on these grounds.

C. Conclusion

For the reasons discussed above, Appellants respectfully submit that this application is in condition for allowance and requests reversal of the outstanding rejections and early allowance of this application. If there are any additional charges with respect to this Appeal Brief or otherwise, they may be charged to Deposit Account No. 06-1130 maintained by Appellants' attorneys.

Respectfully submitted,

KLAUS-LEO WILBUER, ET AL.

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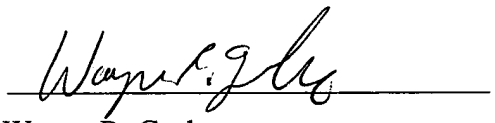
Appellants' attorneys

By: 
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9 APPENDIX

1. A method of producing a coating for the absorption of neutrons created in a nuclear reaction of radioactive materials, where at least part of a shielding element composed of a basic material is provided on a surface predetermined for it with a boron-nickel coating in a dispersion bath containing boron, and during the coating process, at least from time to time, a relative movement is produced between the surface to be coated and the dispersion bath.

2. The method of Claim 1, wherein the relative movement is produced by moving the element to be coated.

3. The method as set forth in Claim 1, wherein the surface to be coated is arranged face up in the dispersion bath.

4. The method as set forth in Claim 1, wherein a dispersion bath with boron carbide is used.

5. The method as set forth in Claim 1, wherein a dispersion bath with boron in element form is used.

6. The method as set forth in Claim 1, wherein the coating is formed chemically.

7. The method as set forth in Claim 1, wherein the coating is formed elecrolytically.

8. The method as set forth in Claim 1, wherein a coating 350 to 500 μm thick is produced.

9. The method as set forth in Claim 1, wherein boron or boron carbide with more than 20% by volume is embedded in the nickel matrix.

10. The method as set forth in Claim 1, wherein boron or boron carbide with more than 40% by volume is embedded in the nickel matrix.

11. The method as set forth in Claim 1, wherein the dispersion bath is mixed, at least from time to time, during the coating process.

12. The method as set forth in Claim 1, wherein the method is carried out in a glass tub.

13. A shielding element produced by producing a coating for the absorption of neutrons created in a nuclear reaction of radioactive materials, where at least part of a shielding element composed of a basic material is provided on a surface predetermined for it with a boron-nickel coating in a dispersion bath containing boron, and during the coating process, at least from time to time, a relative movement is produced between the surface to be coated and the dispersion bath, wherein the shielding element is composed of an inorganic basic material with a boron/nickel coating on top, where the coating contains more than 20% boron or boron carbide by volume.